Endophthalmitis Update: Current Trends & Techniques

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Disclosures

• Allergan (Speaker, Honoraria, Consultant)
• Citrus Therapeutics (Equity)
• davidalmeidaMD.com (Equity)
• Genentech (Speaker, Honoraria, Consultant)
• Regeneron (Speaker, Honoraria, Consultant)

Objectives

• To present the current trends of etiological pathogens in postoperative infectious endophthalmitis

• To describe treatments and techniques for infectious endophthalmitis

1. Postoperative endophthalmitis

• Postoperative exogenous bacterial endophthalmitis = devastating vision-threatening complication of intraocular procedures

What I feared has come upon me; what I dreaded has happened to me.
-Job 3:25
1. Postoperative endophthalmitis

- Postoperative exogenous bacterial endophthalmitis = devastating vision-threatening complication of intraocular procedures

- Since cataract extraction is the most frequently performed intraocular surgery, post-cataract surgery is the most common form of endophthalmitis

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**Postoperative endophthalmitis**

- Acute-onset endophthalmitis: within 6 weeks of intraocular surgery
  - Coagulase negative Staphylococcus
  - Streptococcus
  - Gram negative organism

- Chronic/delayed onset endophthalmitis: beyond 6 weeks of intraocular surgery
  - Propionibacterium acnes
  - Coagulase negative staphylococcus
  - Fungi

- Bleb associated endophthalmitis: months to years after surgery
  - Streptococcus species
  - Haemophilus species
  - Gram positive organisms

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**Endophthalmitis incidence rates (%)**

![Graph showing endophthalmitis incidence rates](https://example.com/graph)

**Causative organisms (n=758)**

- **Gram +** 80%
- **Gram –** 11%
- **Yeast** 9%

  - Staphylococcus epidermidis (CNS)
  - Streptococcus
  - Pseudomonas aeruginosa
  - Candida

  (Arch Ophthalmol 2010; 128(9):1136)

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**Prophylaxis & Prevention**

**Antibiotics for endophthalmitis prophylaxis**

- **Preoperatively**
  - Goal: Limit number of bacteria on ocular surface and achieve intraocular bactericidal levels before surgery
  - Route: Topical

- **Intraoperatively**
  - Goal: Limit inoculation at conclusion of AC at time of surgery
  - Route: Intracameral

- **Postoperatively**
  - Goal: Limit inoculation until sound is sealed and maintain intraocular bactericidal levels after surgery
  - Route: Topical
Evidence-based prophylaxis?

- Preoperative: povidone-iodine antisepsis
  - Grade B recommendation - moderately important to clinical outcome (Ophthalmology 2002;109:13)

- Intraoperative: intracameral cefuroxime
  - ESCR Study (n=16,603)
  - Intracameral cefuroxime at end of surgery provides significant decrease in rates of postoperative endophthalmitis (J Cataract Refract Surg 2007;33:978)

- Postoperative: ?

Resistance

- Reports of endophthalmitis caused by moxifloxacin- and gatifloxacin-resistant organisms

- Increasing resistance to fluoroquinolones in endophthalmitis isolates:
  - Gatifloxacin 36.8%
  - Moxifloxacin 47.4%
  - Levofoxacin 29.0%
  - Ciprofloxacin 43.4%
  (Arch Ophthalmol 2002;120(1):106)

- Resistance

Is topical a false sense of security?

- In cases of complicated cataract surgery (e.g., posterior capsule rupture) or uncomplicated cases where vitreous inoculum overwhelms host defenses, are topical FQ providing a false sense of security?

  - Topical moxifloxacin and gatifloxacin do not penetrate the vitreous at maximal MIC for the most common bacterial pathogens responsible for postoperative endophthalmitis (Retina 2007;27:194)

  - The AC is inadequate at detecting or predicting concomitant vitreous infection; sensitivity 0.36 and specificity 0.71 (Arch Ophthalmol 2002;120(1):106)
2. Treatment & management of postoperative endophthalmitis

**THE BENCHMARK: EVS (n=420, 1995)**

- **Aim:** Establish the role of PPV and intravenous antibiotics in post operative endophthalmitis.
  
- Median time of presentation was 6 days

- 22% presented between 2-6 weeks after surgery
- 26% of patient were LP
- 86% were 5/200 or worse

- 14% had NO hypopyon
- 26% had NO pain on presentation
EVS Outcomes

- Systemic IV antibiotics did not change the outcome visual acuity or media clarity

But EVS is old... Antibiotics

- In cases of complicated cataract surgery (e.g., posterior capsule rupture), oral fourth-generation FQ have excellent vitreous penetration
  - Moxifloxacin 400mg PO daily x1 dose
    - Good vitreous penetration
    - Not available at time of EVS

But EVS is old... Antibiotics

- FQ not available at time of EVS study
- Intraocular penetrance of amikacin and ceftazidime is poor when delivered topical or IV

EVS Outcomes

- HM or better had no difference in outcome between PPV and tap and injection

- LP vision or worse did better with immediate PPV
  - 3 times more likely to have 20/40 or better
  - 2 times more likely to have 20/100 or better
  - Less likely to have < 5/200 vision
  - 53% had better than 20/40 vision
But EVS is old... **Early vitrectomy**

- EVS study relied on old vitrectomy techniques (20-gauge): *increased and significant complication profile*
- Small-gauge quicker and safer for cases in eyes with inflammation

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  - **Infectious Disease Fundamental:** *Removing infectious material paramount to accelerating infection clearance*

3. **Delayed/chronic endophthalmitis**

- 78 year-old female presented with red eye and decreased vision OD 20/50 (baseline 20/20) for 1 month
  - No pain
  - No antecedent trauma
  - Cataract surgery 3 years prior OD
  - PMH: hypertension, hyperlipidemia, osteoarthritis
  - No contributory family history
After corticosteroids

Curvularia endophthalmitis
- Curvularia is a tropical fungus that rarely causes ophthalmic disease (Ann Allergy Asthma Immunol 2006;97:4)
- Only 3 known cases of endophthalmitis in literature
- Very poor prognosis

Curvularia endophthalmitis
- Previous 3 cases presented within 8 weeks of cataract surgery but our case delayed by 3 years with recurrence → occult organism?

Approach to chronic endophthalmitis
- Always have it in the back of your mind
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- May need early removal of hardware
  - Removal of capsular bag and IOL

Role of corticosteroids
- Patient presented with IOL deposits but steroids seems to have initiated a relentless and recalcitrant degree of intraocular inflammation

Use and duration of systemic antifungals
- Long term use usually required

Exam
- BCVA 20/300
- 360° ciliary flush
- Central epithelial defect
- Stromal haze
- Decreased corneal sensation
- Mild anterior chamber reaction

4. Atypical endophthalmitis

30M
- Previously healthy
- No ocular or systemic history
- Contact lens wearer
• Herpes simplex keratitis
  • Confirmed by direct fluorescent antibody testing
- Retinitis
- Pain
- Multiple corneal graft rejections
- Poor vision

→ Enucleation

**Pathology**

A. Cornea

B. AC

C. Vitreous

D. Retina

E. Lymphoid
Acanthamoeba Panuveitis

- Acanthamoeba species are ubiquitous free-living protozoa
  - *A. castellanii*
  - *A. polyphaga*
  - Usually responsible for corneal disease

- Intraocular infection, and particularly Acanthamoeba retinitis, is **extremely rare**

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**Endophthalmitis Conclusions**

- Acute postoperative (cataract) endophthalmitis is most common

- Recommend aggressive treatment to improve clearance of infection

- *Always be on the lookout for chronic or delayed-onset endophthalmitis*
Endophthalmitis Conclusions

- Acute postoperative (cataract) endophthalmitis is most common
- Recommend aggressive treatment to improve clearance of infection
- Always be on the lookout for chronic or delayed-onset endophthalmitis
- Fungal and atypical cases are rare but usually have catastrophic visual outcomes

Thanks!